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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/892,586 | 06/27/2001 | Paul Turner | 1086.2002-001 | 2279 |

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| EXAMINER | |
|---|---|
| SHARON, AYAL I | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2123 | |

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/892,586 | TURNER ET AL. | |
| | Examiner | Art Unit | |
| | Ayal I Sharon | 2123 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 June 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/27/01, 2/26/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Introduction*

1. Claims 1-24 of U.S. Application 09/892,586 filed on 06/27/2001 are presented for examination. The case claims priority to provisional application 60/214,875, filed on 06/29/2000.

### *Claim Rejections - 35 USC § 101*

2. Claims 1-10 and 22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims are directed to an abstract mathematical algorithm which is not implemented in the technological arts, for example, in a computer or on a computer readable medium. The claimed invention is therefore not concrete or tangible. See MPEP §2106 (A), and *In re Warmerdam*, 33 F.3d 1354, 1360, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994). See also *Schrader*, 22 F.3d at 295, 30 USPQ2d at 1459.

### *Double Patenting*

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164

USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 11-20, 21, and 23 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,654,649.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the "initial model" and "non-linear network model" recited in the independent claims in the current application correspond to the "... the controller employing a linear model ..." and "the optimizer utilizing a non-linear model ..." in claim 1 of the issued patent.

Claim 1 in the issued patent recites that "... the controller employing a linear model for modeling effect ...the optimizer utilizing a non-linear model...". Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a "controller" is an intended use implementation of the linear model. Dependent claims 12-20 inherit this defect.

5. Claims 1-10, and 22 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 8 of U.S. Patent No. 6,654,649.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the "initial model" and "non-linear network model" recited in the independent claims in the current application correspond to the "linear model" and "non-linear model ..." in claim 8 of the issued patent.

Claim 8 in the issued patent recites "A method for controlling ... utilizing a linear model ... using a non-linear model ...". Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a "controller" is an intended use implementation of the linear model. Dependent claims 2-10 inherit this defect.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. The prior art used for these rejections is as follows:

8. Wassick et al., U.S. Patent 5,740,033. (Henceforth referred to as "**Wassick**").

9. Treiberet al., U.S. Patent 6,654,649. (Henceforth referred to as "**Treiber**")

10. This reference is referred to as "McCroskey" in the International Search Report submitted by the Applicants on 2/26/02. It is cited as being an "X" reference towards claims 1, 11, and 21-24 in that search report.).

11. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

**12. Claims 1, 11, and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Wassick.**

13. In regards to Claim 1, Wassick- teaches the following limitations:

1. A method for modeling a non-linear empirical process, comprising the steps of

creating an initial model generally corresponding to the non-linear empirical process to be modeled, the initial model having an initial input and an initial output;
(See Wassick, especially: Fig.5, and col.9, lines 5-55)

constructing a non-linear network model based on the initial model, the non-linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Wassick, especially: col.9, line 55 – col.12, line 10)

optimizing the non-linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non linear network model.
(See Wassick, especially: col.11, line 50 – col.12, line 10)

14. Claim 11 is rejected based on the same reasoning as claims 1. Claim 11 is a computer apparatus claim that recites the equivalent limitations as recited in method claim 1, and taught throughout Wassick.

15. In regards to Claim 21, Wassick teaches the following limitations:

21. A computer program product that includes a computer usable medium having computer program instructions stored. thereon for modeling a non-linear empirical process, such that the computer program instructions, when performed by a digital processor, cause the digital processor to:

create an initial model generally corresponding to the non-linear empirical process to be modeled, the initial model having an initial input and an initial output;
(See Wassick, especially: Fig.5, and col.9, lines 5-55)

construct a non-linear network model based on the initial model, the non linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Wassick, especially: col.9, line 55 – col.12, line 10)

optimize the non-linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non linear network model.
(See Wassick, especially: col.11, line 50 – col.12, line 10)

16. In regards to Claim 22, Wassick teaches the following limitations:

22. A method for modeling a polymer process; comprising the steps of:

specifying a base non-linear function for an initial model generally corresponding to the polymer process to be modeled, the initial model including an initial input and an initial output and the base non-linear function including a log of a hyperbolic cosine function;
(See Wassick, especially: Fig.5, and col.9, lines 5-55)

constructing a non-linear network model based on the initial model and including the base non-linear function, the non-linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Wassick, especially: col.9, line 55 – col.12, line 10)

optimizing the non-linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non linear network model by setting constraints based on taking a bounded derivative of the base non-linear function.
(See Wassick, especially: col.11, line 50 – col.12, line 10)

17. In regards to Claim 23, Wassick teaches the following limitations:

23. A computer apparatus for modeling a polymer process; comprising:
a model creator for specifying; a base non-linear function for an initial model generally corresponding to the polymer process to be modeled, the initial model including an initial input and an initial output and the base non-linear function including a log of a hyperbolic cosine function;
(See Wassick, especially: Fig.5, and col.9, lines 5-55)

a model constructor coupled to the model creator for constructing a non linear network model based on the initial model and including the base non

linear function, the non-linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Wassick, especially: col.9, line 55 – col.12, line 10)

an optimizer coupled to the model constructor for optimizing the non linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non-linear network model by setting constraints based on taking a bounded derivative of the base non-linear function.
(See Wassick, especially: col.11, line 50 – col.12, line 10)

18. In regards to Claim 24, Wassick teaches the following limitations:

24. A computer program product that includes a computer usable medium having computer program instructions stored thereon for modeling a polymer process, such that the computer program instructions, when performed by a digital processor, cause the digital processor to:

specify a base non-linear function for an initial model generally corresponding to the polymer process to be modeled, the initial model including an initial input and an initial output and the base non-linear function including a log of a hyperbolic cosine function;
(See Wassick, especially: Fig.5, and col.9, lines 5-55)

construct a non-linear network model based on the initial model and including the base non-linear function, the non-linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Wassick, especially: col.9, line 55 – col.12, line 10)

optimize the non-linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non linear network model by setting constraints based on taking a bounded derivative of the base non-linear function.
(See Wassick, especially: col.11, line 50 – col.12, line 10)

**19. Claims 1-5, 10-15, and 20-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Treiber.**

20. In regards to Claim 1, Treiber teaches the following limitations:

1. A method for modeling a non-linear empirical process, comprising the steps of

creating an initial model generally corresponding to the non-linear empirical process to be modeled, the initial model having an initial input and an initial output;
(See Treiber, especially: Fig.2 and col.3, line 35 to col.5, line 3)

Examiner finds that the claimed "initial model" corresponds to Treiber's "controller 19 employs a linear dynamic model", Item 19, Fig.2

constructing a non-linear network model based on the initial model, the non-linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "non-linear model" corresponds to Treiber's "non-linear model", Item 29, Fig.2

optimizing the non-linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non linear network model.
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "Optimizer" corresponds to Treiber's "optimizer", Item 25, Fig.2

21. In regards to Claim 2, Treiber teaches the following limitations:

2. The method of Claim 1, wherein the step of creating the initial model includes specifying a general shape of a gain trajectory for the non-linear empirical process.
(See Treiber, especially: col.4, line 49 to col.5, line 3)

Examiner finds that Treiber's "View the calculated trajectory of the controlled variable targets" reads on this limitation

22. In regards to Claim 3, Treiber teaches the following limitations:

3. The method of Claim 1, wherein the step of creating the initial model includes specifying a non-linear transfer function suitable for use in approximating the non-linear empirical process.
(See Treiber, especially: col.4, line 49 to col.5, line 3)

Examiner finds that Treiber's "Set the objective function – costs on controlled variables and manipulated variables" reads on this limitation.

23. In regards to Claim 4, Treiber teaches the following limitations:

4. The method of Claim 3, wherein the non-linear network includes interconnected transformation elements and the step of constructing the non-linear network includes incorporating the non-linear transfer function into at least one transformation element.
(See Treiber, especially: col.4, line 49 to col.5, line 3)

Examiner finds that Treiber's "Set constraints – targets or upper and lower limits on controlled variables and manipulated variables" reads on this limitation.

24. In regards to Claim 5, Treiber teaches the following limitations:

5. The method of Claim 4, wherein the step of optimizing the non-linear model includes setting constraints by taking a bounded derivative of the non-linear transfer function.
(See Treiber, especially: col.4, line 49 to col.5, line 3)

Examiner finds that Treiber's "Set constraints – targets or upper and lower limits on controlled variables and manipulated variables" reads on this limitation.

25. In regards to Claim 10, Treiber teaches the following limitations:

10. The method of Claim 1, wherein the non-linear empirical process is part of a greater process, and the method further includes the step of deploying the optimized model in a controller that controls the greater process.
(See Treiber, especially: Fig.2 and col.3, line 35 to col.5, line 3)

Examiner finds that the claimed "controller" corresponds to Treiber's "controller 19", Item 19, Fig.2

26. Claims 11-15 and 20 are rejected based on the same reasoning as claims 1-5 and 10. Claims 11-15 and 20 are computer apparatus claims that recite the equivalent limitations as recited in method claims 1-5 and 10, and taught throughout Treiber.

27. In regards to Claim 21, Treiber teaches the following limitations:

21. A computer program product that includes a computer usable medium having computer program instructions stored. thereon for modeling a non-linear empirical process, such that the computer program instructions, when performed by a digital processor, cause the digital processor to:

create an initial model generally corresponding to the non-linear empirical process to be modeled, the initial model having an initial input and an initial output;
(See Treiber, especially: Fig.2 and col.3, line 35 to col.5, line 3)

Examiner finds that the claimed "initial model" corresponds to Treiber's "controller 19 employs a linear dynamic model", Item 19, Fig.2

construct a non-linear network model based on the initial model, the non linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "non-linear model" corresponds to Treiber's "non-linear model", Item 29, Fig.2

optimize the non-linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non linear network model.
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "Optimizer" corresponds to Treiber's "optimizer", Item 25, Fig.2

28. In regards to Claim 22, Treiber teaches the following limitations:

22. A method for modeling a polymer process; comprising the steps of:

specifying a base non-linear function for an initial model generally corresponding to the polymer process to be modeled, the initial model including an initial input and an initial output and the base non-linear function including a log of a hyperbolic cosine function;
(See Treiber, especially: Fig.2 and col.3, line 35 to col.5, line 3)

Examiner finds that the claimed "initial model" corresponds to Treiber's "controller 19 employs a linear dynamic model", Item 19, Fig.2

constructing a non-linear network model based on the initial model and including the base non-linear function, the non-linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "non-linear model" corresponds to Treiber's "non-linear model", Item 29, Fig.2

optimizing the non-linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non linear network model by setting constraints based on taking a bounded derivative of the base non-linear function.
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "Optimizer" corresponds to Treiber's "optimizer", Item 25, Fig.2

29. In regards to Claim 23, Treiber teaches the following limitations:

23. A computer apparatus for modeling a polymer process; comprising:
a model creator for specifying; a base non-linear function for an initial model generally corresponding to the polymer process to be modeled, the initial model including an initial input and an initial output and the base non-linear function including a log of a hyperbolic cosine function;
(See Treiber, especially: Fig.2 and col.3, line 35 to col.5, line 3)

Examiner finds that the claimed "initial model" corresponds to Treiber's "controller 19 employs a linear dynamic model", Item 19, Fig.2

a model constructor coupled to the model creator for constructing a non linear network model based on the initial model and including the base non linear function, the non-linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "non-linear model" corresponds to Treiber's "non-linear model", Item 29, Fig.2

an optimizer coupled to the model constructor for optimizing the non linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non-linear network model by setting constraints based on taking a bounded derivative of the base non-linear function.
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "Optimizer" corresponds to Treiber's "optimizer", Item 25, Fig.2

30. In regards to Claim 24, Treiber teaches the following limitations:

24. A computer program product that includes a computer usable medium having computer program instructions stored thereon for modeling a polymer process, such that the computer program instructions, when performed by a digital processor, cause the digital processor to:

specify a base non-linear function for an initial model generally corresponding to the polymer process to be modeled, the initial model including an initial input and an initial output and the base non-linear function including a log of a hyperbolic cosine function;
(See Treiber, especially: Fig.2 and col.3, line 35 to col.5, line 3)

Examiner finds that the claimed "initial model" corresponds to Treiber's "controller 19 employs a linear dynamic model", Item 19, Fig.2

construct a non-linear network model based on the initial model and

including the base non-linear function, the non-linear network model having multiple inputs based on the initial input and a global behavior for the non-linear network model as a whole that conforms generally to the initial output; and
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "non-linear model" corresponds to Treiber's "non-linear model", Item 29, Fig.2

optimize the non-linear network model based on empirical inputs to produce an optimized model by constraining the global behavior of the non linear network model by setting constraints based on taking a bounded derivative of the base non-linear function.
(See Treiber, especially: Fig.2 and col.4, line 21 to col.5, line 3)

Examiner finds that the claimed "Optimizer" corresponds to Treiber's "optimizer", Item 25, Fig.2

***Allowable Subject Matter***

31. The following are statements of reasons for the indication of allowable subject matter.

32. In regards to Claim 16, neither the Treiber reference nor the Wassick reference expressly teach the following limitations:

16. The computer apparatus of Claim 15, wherein the non-linear transfer function includes the log of a hyperbolic cosine function.

33. In regards to Claims 17-19, Examiner finds that U.S. Patent 6,654,649 ("the Treiber reference"), in combination with U.S. Patent 5,877,954 ("Klimasauskas et al.") teach the claimed limitations. However, both U.S. Patents were assigned to the assignee of the current application at the time the invention was made. Therefore, 35 U.S.C. 103(c) applies.

***Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached at (571) 272-3716.

Any response to this office action should be faxed to (703) 872-9306 or mailed to:

Director of Patents and Trademarks
Washington, DC 20231

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon

Art Unit 2123

February 2, 2005